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ABSTRACT

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Influence of Course Structure on Student Affect:

The Structural Affect Hypothesis

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Abstract

Course instruction was manipulated to yield two different levels of structure in an exploratory analysis of the effects of course structure on student satisfaction in 166 introductory educational psychology students. Results suggested that student satisfaction for different degrees of course structure depends on personality attributes. Seven significant interactions were found, five of which suggested a possible pattern. More specifically, students who prefer Moderate Structure to High Structure tend to score high on a number of ACL scales (i.e. Dominance, Change, Number of Favorable Adjectives Checked, Affiliation, and Intraception) which collectively identify individuals who are described as dependable, cooperative, resourceful, adaptable and curious. Methodological and theoretical implications are discussed, and the need for further ATI research on affective outcomes is suggested.

Influence of Course Structure on Student Affect:

The Structural Affect Hypothesis

A number of reviews have documented the advantages of considering possible attribute-treatment interaction (ATI) phenomena in explaining student achievement (Berliner & Cahen, 1973; Cronbach & Snow, 1977; Hunt, 1975; Salomon, 1972; Snow, 1976). A strikingly smaller number of researchers have considered student satisfaction as an ATI outcome variable. For example, reviews of the ATI literature by Bracht (1970), Salomon (1972), Hunt (1975), and Tobias (1976) do not appear to contain any affective studies. In a survey of current ATI literature, Strom (1978) was able to locate only 21 studies using student affect as an outcome variable. The advantages of investigating affective reactions to instruction have been well-established (Bloom, 1976; Messick, 1970; Pascal, 1973). As Pascal (1973) has observed, instructors generally assume that different course treatments (e.g., options) will have a differential effect on student affect. In other words, some students will react positively to certain options, while other students will react negatively. Consequently, any evaluation of the affective outcome of an instructional treatment will have to consider the moderating effects of individual difference variables.

In reviewing the ATI literature, Cronbach & Snow (1977) and Snow (1976) develop the constructive motivation hypothesis to explain some consistencies in ATI research. Briefly, this hypothesis suggests that certain students will benefit from educational treatments which provide freedom rather than structure. The traits associated with this benefit are

not well established, but Cronbach & Snow's review of the literature suggests several, namely, need for power, achievement via independence, responsibility, and intellectual efficiency. Cronbach & Snow's evidence for the constructive motivation hypothesis stems from a variety of treatments such as instructor directiveness (Domino, 1968; 1971); teacher structure and student participation (Peterson, 1977); encouragement of student participation (McKeachie, 1961); independent study (Bigelow & Egbert, 1968); filmed vs. live instruction (Snow, 1965); teacher spontaneity (Heil, Powell & Feifer, cited in Cronbach & Snow, 1977); teacher centered versus student centered (Porteus, cited in Snow, 1976); and contract-grading (Daniels & Stevens, 1976). To date, the constructive motivation hypothesis has generally been limited to educational achievement as an outcome variable, and no previous study has been specifically designed to investigate student affect.

The purpose of the present study is to extend the constructive motivation hypothesis to the affective domain. It is predicted that personality traits will interact with course structure in the prediction of student satisfaction. To distinguish this hypothesis from the constructive motivation hypothesis, it will be called the structural affect hypothesis. In line with Cronbach & Snow's (1977) recommendations, replicable and practical instructional treatments are used in a naturalistic setting. Specifically, the degree of structure in each treatment group is manipulated by the degree to which student choice was permitted in fulfilling course requirements. Cronbach and Snow also recommend that several different attribute variables be measured. This is particularly important in that course structure can interact with a variety of traits in the prediction of student affect. Previous research and conceptual guidelines suggest

that the Adjective Check List (Gough & Heilbrun, 1965) and the California Psychological Inventory (Gough, 1957) measure a variety of traits that might interact with course structure. In particular, Self-Control, Achievement, Dominance, Endurance, Order, Authonomy, Change, Deference, and the Number of Adjectives Checked are included from the ACL, while Dominance, Capacity for Status, Responsibility, Socialization, Self-Control, Tolerance, Achievement via Conformance, Achievement via Independence, Intellectual Efficiency and Flexibility are included from the CPI. Finally, Rotter's IE Scale (Rotter, 1966) is also included as an attribute variable.

It is important to emphasize that the selection of the variables listed above is somewhat arbitrary in that there is insufficient ATI theory and research in the area of student satisfaction. In addition, a number of these variables have been drawn from successful ATI studies where achievement rather than satisfaction was the outcome variable. In summary, due to the nature of the selection of personality attributes, the present analysis should be considered exploratory rather than confirmatory.

Method

Subjects

Treatments were randomly assigned to two different sections of a course in Educational Psychology. The High and Moderate Structure groups contained 93 and 73 students, respectively. Initially, the study involved an additional Low Structure group. This group was omitted from the present analysis, because it differed from the other groups in many respects which were unrelated to the treatment variable.

Course Structure Manipulation

The instructional methods designed for the two different sections of the course were designated as High and Moderate Structure and were taught by the same instructor. The degree of structure in each section was defined by the amount of prescriptiveness in the course outline and by the degree to which student choice was permitted in fulfilling course requirements. More specifically, the High Structure group met in fifty minute lectures three times weekly. Attendance at lectures was required. Reading material relevant to the course was assigned. Students were evaluated on the basis of their scores on four regularly scheduled multiple choice examinations covering assigned readings and lecture materials. Students were given concrete feedback on examination results in the form of a letter grade.

The Moderate Structure group met in 75 minute lectures twice weekly. Attendance at lectures was required. Reading material relevant to the course was assigned. Students were evaluated on the basis of their scores on two regularly scheduled multiple choice examinations covering assigned readings and lecture material. In addition, students were required to submit two written project activities. The topic, length, and nature of these activities were determined by the students themselves. A list of possible activities was given in the course outline. Some illustrative activities include tutoring, reviewing scholarly journals, planning a teaching unit, volunteering services to an educational institution, summarizing research, observing innovative classrooms, reviewing teacher magazines, interviewing teachers, etc. It should be noted that the majority of the listed activities were open-ended, non-directive ones, and that students were free to substitute any course-relevant activity of their own

choice, with instructor approval. Students were given only a qualitative symbol marking (e.g. +, v, - etc.) on the examinations and written project activities, along with the instructor's comments. The symbol system was intended to communicate some measure of the quality of the work but did not translate directly to a letter grade.

In summary, the High Structure treatment was differentiated from the Moderate Structure treatment by increased class meetings, more frequent and more heavily weighted examinations, more emphasis on evaluation, more explicit knowledge of grade results, and the absence of open-ended projects.

Attribute Variables

Personality measures were collected using Rotter's Internal versus External Locus of Control Scale (Rotter, 1966), the Adjective Check List (ACL) (Gough & Heilbrun, 1965) and the California Psychological Inventory (CPI) (Gough, 1957). The ACL consists of 24 personality traits. Course structure was hypothesized to interact with the nine ACL scales described in Table 1. Twelve other scales were not considered likely to yield an attribute-treatment interaction, but scores were derived for exploratory analyses. These scales were Number of Adjectives Checked, Number of Unfavorable Adjectives Checked, Self-Confidence, Personal Adjustment, Intraception, Nurturance, Affiliation, Heterosexuality, Exhibition, Aggression, Succorance, and Abasement. All of these ACL scales had coefficient alpha reliabilities which exceeded .60. Three ACL scales were not used, either due to low reliability ($< .50$) or due to scoring difficulties. These scales were Lability, Counseling Readiness and Defensiveness.

Insert Table 1 About Here

The CPI can be scored for 18 personality traits. Of these 18 traits, ten were hypothesized as likely to interact with course structure. These are shown in Table 1. Additionally, seven other CPI scores were derived although no specific hypotheses were made: These scales were Sociability, Social Presence, Sense of Well-Being, Good Impression, Communality, Psychological-Mindedness, and Femininity. The CPI variables which had reliabilities in the .50-.60 range, were Capacity for Status, Femininity, Communality and Psychological Mindedness. The remaining scales had reliabilities which exceeded .60. The Self-Acceptance Scale was not used due to its low reliability (.48).

Gender and a measure of verbal intelligence were also included as attribute variables. Verbal intelligence was measured using the Concept Mastery Test (Terman, 1951). It is a standardized test consisting of a synonyms/antonyms section and an analogies section.

Dependent Variables

During the last regular class period of the semester, students were asked to fill out two questionnaires regarding their satisfaction with the Educational Psychology course. The 64-item College Faculty Performance Check List (Schuler, 1974) was administered to all students in class. The items on the Faculty Performance Check (FPC) List are behaviorally stated, expressing positive and negative sentiments about aspects of the course and the instructor. Illustrative items include (a) Ideas are presented clearly

and exactly, (b) Assists students in locating information, (c) Uses the full class period constructively. Students respond on a yes/no/does-not-apply basis. An alpha coefficient of internal consistency was computed, showing the FPC List to be highly reliable ($\alpha = .88$) for the student sample.

As a second measure of satisfaction, students were asked to complete a 24-item Course Evaluation Form. The Course Evaluation Form consisted of twelve items seeking positive and negative responses about aspects of the course. These responses were on a seven-point Likert scale ranging from strong positive to strong negative. Illustrative items are (a) How satisfied were you with your own performance? and (b) How much did you enjoy doing the work in this course? The remaining twelve items were of a seven-point semantic differential nature (e.g. interesting-not interesting: valuable-worthless). An alpha coefficient of internal consistency was computed, showing the Course Evaluation to be highly reliable ($\alpha = .92$) for the student sample.

The two measures of student satisfaction, College Faculty Performance Check List, and the Course Evaluation Form correlated .58. To enhance reliability, these two measures were combined to yield a total satisfaction score. Total satisfaction scores were obtained by converting the two raw scores to z-scores and summing the z-scores. High z-scores indicate high levels of satisfaction.

Results

Table 2 shows the means and standard deviation of total satisfaction scores for the two treatment groups. Regression analysis (described below)

indicates that the main effect of the treatment is significant, $F(1,143) = 4.98$, $p < .05$, suggesting that students in the Moderate Structure condition expressed more satisfaction with the course.

Insert Table 2 About Here

Data were further analyzed using a hierarchical multiple regression. In hierarchical order of entry, total satisfaction was regressed on: (a) the main effects of the traits shown in Table 1, (b) a dummy variable for treatment, and (c) dummy variables for interaction of traits and treatment. Vectors representing the main effect and interaction for sex and locus of control were also included. This method of analysis is described by Cohen and Cohen (1975, pp 319-324).

After partialling all personality main effects and treatments (but not interactions), in the hierarchical regression, four significant attribute by treatment interactions were found. These were ACL Change, $F(1,141) = 4.23$, $p < .05$; ACL Dominance, $F(1,141) = 3.40$, $p < .05$; CPI Flexibility, $F(1,141) = 4.96$, $p < .05$; and ACL Number of Favorable Adjectives Checked, $F(1,141) = 7.34$, $p < .05$. The interactions for Change, Dominance, and Number of Favorable Adjectives Checked are shown in Figures 1 through 3. For high scorers on the three variables, Moderate Structure is preferred over High Structure. Individuals who are forceful and persevering (as indicated by the Dominance Scale), dependable and conscientious (as indicated by Number of Adjectives Checked) and who are adaptable and curious (as indicated by the Change scale), are more satisfied with conditions of Moderate Structure. Figure 4 shows the

fourth interaction. Low scorers on the Flexibility scale are more satisfied in the Moderate Structure condition. This result might seem to run counter to intuition, however, low scorers are described as deliberate, cautious, and worrying. It is possible that such people are anxious about the number and importance of examinations in the High Structure condition and are therefore less satisfied in that treatment.

Additional exploratory multiple regression analyses were performed on the remaining ACL and CPI scales. In these analyses, significant interactions were found for ACL Affiliation, $F(1,141) = 6.30, p < .05$; ACL Personal Adjustment, $F(1,141) = 5.74, p < .05$; and ACL Intraception, $F(1,141) = 4.60, p < .05$. The interactions for Affiliation and Intraception are shown in Figures 5 and 6, respectively. High scorers on Affiliation, described in the ACL manual as adaptable, considerate, cooperative and warm, are more satisfied in the Moderate Structure condition. Similarly, high scores on Intraception, described as alert, curious and insightful, are more satisfied with Moderate Structure. Finally, as shown in Figure 7, low scorers on Personal Adjustment, described as arrogant, dissatisfied and intolerant prefer High Structure to Moderate Structure.

As described earlier, main effects were included in both regressions prior to entering treatment and interactions. In this case, it makes little sense to discuss the main effects of intercorrelated personality attributes with other variables partialled. As a result, only the zero-order correlations are included. Three significant ($p < .05$) correlations were found between Course Satisfaction and attributes: Nurturance ($r = .15$), Heterosexuality ($r = .18$) and Number of Unfavorable Adjectives Checked ($r = .22$). Since the focus of the present analysis is on interactions, these main effects are not discussed.

Discussion

As mentioned earlier, this is an exploratory rather than confirmatory analysis. Consequently, only a general pattern, indicated by five of the significant interactions, will be discussed. This pattern is illustrated in Table 3. The interactions listed there suggest an interesting post hoc explanation. Specifically, students who are described as dependable, cooperative, resourceful, adaptable, and curious appear to prefer Moderate Structure. Such results may indicate that "independent" students prefer being "matched" with the Moderate Structure condition. In spite of the exploratory nature of this research, this interpretation would provide intuitively appealing support for the Structural Affect Hypothesis. Just as Cronbach and Snow (1977) demonstrated that certain students achieve more under structured conditions, the present analysis suggests that individual differences moderate the influence of course structure on student satisfaction.

In light of the fact that a number of conceptually related CPI scores did not support this interpretation (e.g., Intellectual Efficiency and Achievement via Independence), it must be considered tentative and suggestive of further research. The fact that the CPI scales were involved in only one significant interaction and no significant main effects in this study is puzzling. One possibility is that the student sample may have not taken the lengthy CPI inventory seriously. The generally lower reliabilities (only five measured traits had alphas greater than .70) suggest this possibility.

While the present research identified a number of significant interactions between course structure and personality attributes, there are four methodological recommendations which could enhance the quality of future research on the interaction of course structure and student satis-

faction. First, most ATI studies in the affective domain have used measures of global satisfaction rather than satisfaction instruments designed to measure attitudes about specific aspects of instruction (e.g. instructor, subject matter), etc. Intuitively, the latter instruments would yield finer measures of educational satisfaction. Consequently, existing structural ATIs would be easier to identify.

Second, rather than rely on standard personality inventories, researchers might be better advised to develop personality measures that apply to classroom settings. Traits like need for achievement, need for dominance, flexibility etc., may be useful in general settings, but not manifest themselves in a classroom. By developing measures of "classroom personality" the assumptions of cross-situational consistency can be avoided. This strategy will limit generalizability, but practical implications of ATI research might be enhanced.

Third, there is a need to improve the measurement of the structure of educational treatments. While it is often easy to intuitively rank or describe educational treatments according to structure, more information is needed on how these treatments actually differ. Since courses have several dimensions (e.g. assignments, instructors, subject matter, difficulty level, etc.), course structure is naturally a complex concept. Different student attributes may interact with different dimensions of course structure.

Finally, while long term and realistic treatments are considered a virtue, they permit a host of things to occur that may legislate against interaction findings. Student perceptions of treatments may change over time. Instructional treatments may not remain consistently different. Students may adapt to treatments through compensation or remediation.

Classroom groups may form in such a fashion that the group has greater influence on students than does the instructional method. All of these possibilities suggest the need to analyze the classroom environment periodically throughout the duration of the instructional treatments. A number of researchers have advocated this sort of analysis (Dowaliby and Schumer, 1973; Shulamn, 1970; Snow, 1976). Potential analyses include use of audiotapes, teacher logs, student perceptions (Porteus, cited by Snow, 1976), independent raters (Winne, 1977), Walberg and Anderson's (1968) Learning Environment Inventory, and media taxonomies (see Clark, 1975, for review).

The study of attribute treatment interactions in the affective domain offers exciting possibilities. While this study was limited to course structure, the affective components of numerous other educational treatment variables need investigation. Merrill (1975) and Tobias (1976) have suggested that achievement ATI's may be difficult to demonstrate because students adapt to methods of instruction. In other words, a student confronted with a structure that he is not suited for may still be motivated to achieve in any way possible. While students may feel obligated to adapt in order to achieve they would not feel obligated to "like" the instructional method. Thus, satisfaction may be more sensitive to structural manipulation than is achievement. That is, satisfaction data may yield attribute-treatment interactions where achievement data do not.

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Footnotes

The present research has been undertaken as a reanalysis of the first author's doctoral dissertation at Cornell University. A deep debt of gratitude is owed to Professors Richard A. Ripple, Emil J. Haller, and Jack A. Barwind for their substantial help in the production of that dissertation.

Table 1

Trait description for the Adjective Check List
and the California Psychological Inventory

Adjective Check List (ACL)

1. Self-control: serious, sober, interested, responsive, diligent practical
loyal, overly controlled and proper.
2. Need for Achievement: intelligent, hardworking, involved, determined,
successful, goal oriented, trusting, and optimistic.
3. Need for Dominance: forceful, strong-willed, persevering, confident,
direct, resourceful, aggressive, and forthright.
4. Need for Endurance: self-controlled, responsible, idealistic,
righteous, and conventional.
5. Need for Order: sincere, dependable, conforming, unspontaneous,
self-denying, and inhibited.
6. Need for Autonomy: independent, autonomous, assertive, self-willed,
and indifferent to others.
7. Need for Change: perceptive, alert, spontaneous, quick to comprehend,
incisive, self-confident, curious, and adaptable.
8. Need for Deference: conscientious, dependable, persevering, self-
denying, anonymous, free, modest and yielding.
9. Number of favorable adjectives checked: strong desire to do well,
dependable, steady, conscientious, serious and concerned about others.

Table 1 continued

California Psychological Inventory (CPI)

1. Dominance: aggressive, persistent, confident and planful.
2. Capacity for Status: ambitious, active, forceful, insightful, resourceful, and versatile.
3. Responsibility: conscientious, responsible and dependable disposition and temperament.
4. Socialization: serious, honest, conscientious, responsible, self-denying and conforming.
5. Self-Control: practical, self-denying, thoughtful, deliberate, and thorough in their own work.
6. Tolerance: enterprising, informal, tolerant, resourceful and intellectually able.
7. Achievement via Conformance: capable, cooperative, organized, efficient, responsible, persistent, and values intellectual activity.
8. Achievement via Independence: mature, forceful, strong, dominant, independent, self-reliant and superior in intellectual ability.
9. Intellectual Efficiency: efficient, clear-thinking, capable, intelligent, planful, resourceful, and values intellectual matters.
10. Flexibility: insightful, informal, adventurous, assertive, highly concerned with personal pleasure and diversion.

NOTE. The above descriptions are derived from the ACL and CPI test manuals.

Table 2

Means and Standard Deviations for Total Satisfaction Scores

	Medium Structure	High Structure
Mean	.38	-.36
Standard Deviation	1.95	1.50

Note. High scores indicate high student satisfaction. $N = 73$ and 93 for the Moderate and High structure groups, respectively. Total satisfaction scores were obtained by summing the z -scores from the Faculty Performance Check List and the Course Evaluation Form.

Table 3

Characteristics of Students Who Prefer
Moderate Structure

<u>Number of Favorable Adjectives Checked</u>	<u>Dominance</u>
conscientious	aggressive
dependable	forceful
serious	resourceful
 <u>Affiliation</u>	 <u>Change</u>
adaptable	adaptable
cooperative	curious
considerate	spontaneous
 <u>Intraception</u>	
curious	
insightful	
sensitive	













